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Course evaluation for technology enhanced learning: current status in Europe

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Abstract: Course evaluation is one of the key processes in the educational context that is in charge of the assurance of quality of courses taught in an institution. Although it is an essential process realised in every institution, the procedure followed for course evaluation does not comply with any evaluation standard. The objectives of this document are: to define a course evaluation concept map to understand better the needs of this field; to analyse the course evaluation standard ISO/IEC 19796, the only standard for course evaluation; to carry out a study of European institutions evaluation processes to determine why no institution is using standards in this learning process; and finally, to inform about the course evaluation support in two open-source well-known learning management systems (LMS) (Moodle and .LRN).

Keywords: course evaluation; shared-teaching; ISO/IEC 19796; learning management systems; LMS; European institutions; HEI; technology enhanced learning.

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1 Introduction

Course evaluation, covering the different aspects of the quality control of teaching and learning process, is a critical factor for guaranteeing learning quality and course improvement. Consequently, course evaluation is widely spread in practice and applied to almost any learning process. Surprisingly, despite its importance and dissemination, it is scarcely formalised and no standards exist for facilitating its adoption[1].

The main objective of this article is to have a look at the current situation of course evaluation in European Higher Education institutions. This generic objective can be divided in four smaller ones: to present the development of a concept map for the domain of course evaluation; to summarise a study performed on a current quality management assurance metrics standards; to provide a global picture of the current status of course evaluation practices in Europe; and to study the support for course evaluation in learning management systems (LMS).

The theoretical model contained in this article has been developed through a series of reviewing sessions, undergoing continuous modifications in order to achieve a model capable of describing the essential elements and procedures involved in learning quality assurance.

The standard studied in this paper is ISO/IEC 19796, parts 1 and 3 which are the only sections released up to the date of the creation of this article. These parts provide a general approach and a reference for methods and metrics within the context of quality management in information technology for learning, education and training.

Other approaches to evaluation have been also taken into account. The first one is the usage of IEEE LOM to attach quality information to learning objects (Morales et al, 2008).

The current status of evaluation practices in Europe has been obtained by the analysis of a set of representative scenarios. The methodology applied includes both personal interviews as well as surveys. Data have been gathered from institutions involved in the ICOPER project, mostly higher education institutions but also some commercial companies related to the educational field, which provides a wide perspective on the application of course evaluation in real institutions thorough Europe.

ICOPER is an eContentPlus Best Practice Network that started its work in September 2008. As part of its objectives, ICOPER will provide a *reference model* and mechanisms to ensure European-wide user involvement, cooperation, and adoption of standards in the educational framework. To accomplish this goal, the project will systematically analyse the specifications and standards available and in use, to draw conclusions on their validity. In the context of the ICOPER project, an effort is under way to detect the course evaluation standards problems and to propose a set of best practices according to their usage in European institutions.

This article is structured as follows: in Section 2 is devoted to an in-depth analysis of course evaluation concepts and standards; Section 3 presents a study of course evaluation in European institutions; Section 4 studies the support of course evaluation in LMS; and finally, Section 5 presents the main conclusions and future work in the course evaluation field.

2 Course evaluation concepts and standards

In this section the development of a concept map about course evaluation is presented. After that, and taking into account the main concepts in this field, an analysis of ISO/IEC 19796 is performed, because it is the only standard available for course evaluation.

2.1 Concept map

As part of the ICOPER reference model, a conceptual map modelling key concepts for course evaluation is being developed, by capturing key concepts and related specifications. The importance of defining such a set of concepts in the domain of course evaluation relies on the need of, on one hand, clarifying the terminology used in the study and, on the other hand, establishing the relationships between these concepts.

The evaluation concept map in Figure 1 is focused on the *course evaluation* concept, which is understood as the process of identifying, obtaining and interpreting data to determine which course objectives are being achieved; this definition comes from the concepts of assessment and evaluation in ABET (2008–2009). The course evaluation is ruled by a quality assurance approach, usually a learning quality assurance standard, specification or guide.

The data collected during the evaluation process provides a performance qualification of the different aspects of the educational process: unit of learning, the learning supporter and the learner assessment. Such aspects cover the educational content and instructional design (unit of learning), the activity of the instructor (learning supporter) and the learner assessment process (learner assessment), as extracted from the ICOPER reference model (IRM) (Kozlov et al., 2009). The final output generated by the course evaluation is the Evaluation Result, which reports formally the quality status of the course.

The IRM is a model based on the state-of-the-art in standards and specifications in the field that support learning outcome-driven content management in technology-enhanced learning (TEL). The main objectives of this conceptual model are:

- to describe the domain of outcome-based, TEL
- to illustrate the structure of the reference model to support stakeholders to develop, use and improve (information and communication) systems for outcome-based learning
- to initiate a discourse process on the reference model
- to incorporate best-practices to a common body of knowledge around this model

The model consists of the following levels:

- processes: key processes for the development, use, and improvement of outcome-based learning
- services: a classification and a description format as well as a collection of (technical) services that can be incorporated when developing outcome-based learning systems
- data: data models for data and information exchange between teaching and learning systems to improve interoperability.

The IRM allocates the evaluation processes within the service layer. The key processes of the evaluation domain have been identified like:

- creating survey
- visualising survey
- submitting evaluation
- visualising global results.

All of these processes belong to the evaluation stage of the process model. There has been an emphasis on the use of questionnaires to collect the evaluation data since field studies reveal that this is the methodology most commonly applied.

Figure 1 Course evaluation concept map (see online version for colours)

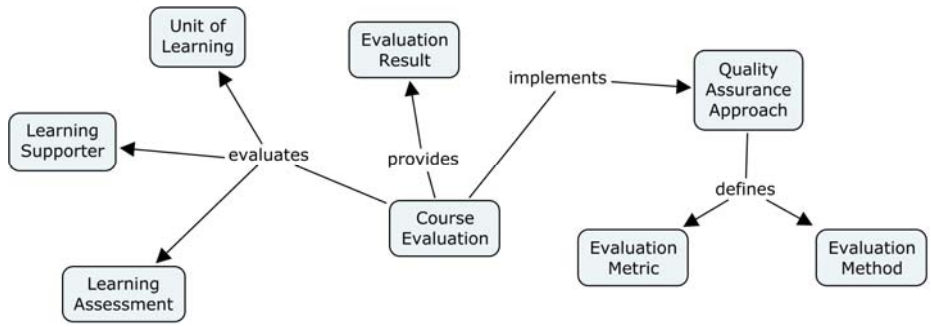


Table 1 ISO/IEC 19796-3 model

ID	*Category*	*Sub-processes/sub-aspects*	
NA	Needs analysis	1	Initiation
		2	Stakeholder identification
		3	Definition of objectives
		4	Demand analysis
FA	Framework analysis	1	Analysis of the external context
		2	Analysis of staff resources
		3	Analysis of target groups
		4	Analysis of the institutional and organisational context
		5	Time and budget planning
		6	Environment analysis
CD	Conception/design	1	Learning Objectives
		2	Concept for contents
		3	Didactical concept/methods
		4	Roles and activities
		5	Organisational concept
		6	Technical concept
		7	Concept for media and interaction design
		8	Media concept
		9	Communication concept
		10	Concept for tests and evaluation
		11	Concept for maintenance
DP	Development/production	1	Content realisation
		2	Design realisation
		3	Media realisation
		4	Technical realisation
		5	Maintenance
IM	Implementation	1	Testing of learning resources
		2	Adaptation of learning resources
		3	Activation of learning resources
		4	Organisation of use
		5	Technical infrastructure
LP	Learning process	1	Administration
		2	Activities
		3	Review of competency levels
EO	Evaluation/optimisation	1	Planning
		2	Realisation
		3	Analysis
		4	Optimisation/improvement

Table 2 Collection of methods

Category	*Sub-categories*
Discussion/talks	Discussion/talks
Survey	Survey
Analysis	Analysis
Implementation models and guidelines	Implementation models and guidelines
Measurement	Measurement
Testing	Testing
Modelling	Modelling
Quality control and quality engineering method	Quality control and quality engineering method
Problem solving method	Problem solving method

Table 3 Collection of metrics

Categories of metrics	*Sub-categories*	
Function metrics	1	Learning promotion functions
	2	Learning support function
	3	Learning sustainability function
	4	Educators support function
	5	Usage function
Element metrics	1	Learning evaluation
	2	Course evaluation
	3	Curriculum evaluation
	4	Instructor evaluation
	5	Institution/school evaluation
Attribution metrics	1	Functionality
	2	Reliability
	3	Usability
	4	Efficiency
	5	Maintainability
	6	Portability
	7	Educational suitability
Scale metrics	1	Time
	2	Period
	3	Response
	4	Amount
	5	Statistical basis
	6	Rate
	7	Degree

2.2 ISO/IEC 19796-1

Part 1 of the ISO/IEC 19796 standard provides a general approach for quality management, assurance and metrics in learning, education and training scenarios.

The purpose of part 1 is to provide a reference framework for the Description of Quality Approaches, which is defined as a framework to describe, compare and analyse quality management and quality assurance approaches.

In order to describe and elaborate this reference framework, part 1 includes its process model. This process model is a framework used for the description, comparison and analysis of process-oriented quality approaches and can be used in other scenarios such as the harmonisation of quality approaches.

The process model is divided in seven parts where every part includes a set of sub-processes or sub-aspects.

It is stated in part 1 that a quality description conforms to the standard if each included process corresponds to the appropriate specification and includes all sub-processes. A conforming description may contain additional processes and data elements.

Due to the relevance of this framework, the IRM has adopted this process model for the classification of key processes.

2.3 ISO-IEC 19796-3

Part 3 of the ISO/IEC 19796 standard, *reference methods and metrics*, provides a harmonised description of the methods and metrics that are needed in the implementation of systems of quality management and quality assurance for stakeholders involved in a learning process that makes use of information technology.

Previous to classifying the methods and metrics involved in a learning quality assurance process, it is important to define these terms. In a quality approach context, method is one of a set of instruments or tools used to assure or manage quality in processes, while metric is a material measure within some aspects of quality characteristics.

This part of the standard provides the reference models for quality methods and for quality metrics. Some previous studies, like Lytras et al. (2001) and Hirata (2006), explain the importance of such models and show the evolution that they experienced in order to contain the critical aspects of any quality method and quality metric.

A relevant section of part 3 is the collection of methods and metrics, which consist of a classification of categories, category descriptions and subcategories of methods. A summary of these collections is presented as follows in Tables 1, 2 and 3.

3 Course evaluation in Europe

3.1 An overview of course evaluation in Europe: the current picture

A series of interviews and reports have been used to collect the analysed data. The participating institutions are all inside ICOPER consortium. An in depth analysis is very appropriate in this study and ICOPER consortium provide us with this possibility. It is

particularly suitable to determine and analyse the causes of the lack of standards utilisation in some of the participating organisations.

The sample we have worked on features the following characteristics that make it remarkably appropriate for the intended purpose of the analysis:

- deals with formal and informal learning
- deals with face-to-face, blended and pure e-learning examples
- it is geographically distributed all around Europe (geographical diversity)
- the sample distribution also covers multicultural and multilingual examples.

As shown in Table 4, studied scenarios are much heterogeneous, though some commonalities between them emerge:

- the role of evaluators is usually performed by the students
- neither teacher nor quality assurance (external) institutions perform any evaluation according to standards
- in all cases the objectives are mainly formative (course improvement)
- the access to the evaluation results is quite varied, but, in general, the lecturer(s)/instructor(s) is (are) the main intended audience; occasionally the students can access to this information too
- the most common methodology instrument is the questionnaire/survey; some other methods like group discussion are applied but in just one case
- the tools used in these institutions are mainly paper (almost all of them) with an emerging trend towards the use of online questionnaires (still sporadic), often integrated in LMS, and in other cases surveys/questionnaires are attached to specific tools.

Regarding standards usage, the trend is quite clear: none of the participating institutions apply a specific standard for course evaluation. An internal, ad hoc methodology is however followed. An institution-dependant approach is followed in some cases, whereas in other cases evaluation management is directly conducted by the lecturer of the course. Finally, there exists a scarce use of course evaluation content repositories and the evaluation process is usually anonymous.

The entities that are evaluated are the course and sometimes the instructors and tools. In the case of JSI (Bubaš et al., 2007), the evaluation of the course consisted on questions of several topics: educational content, assessment, communication, personalisation, and directedness. The questions about tools also covered different aspects like multimedia or technical elements.

In the concrete case of UK, universities are their own awarding bodies and they continually assess their systems and their courses to ensure that they are fit for purpose. In addition, all universities use a network of external experts – called external examiners – to advice on whether the standards a university sets are appropriate (Universities UK, 2008).

Table 4 Course evaluation survey results

Institution	*Evaluator*	*Evaluee*	*Process*	*Repos.*	*Artifact/tool*	*Other info.*
IMC AG	Student	Course instructors	Ad hoc	Yes	Survey/CLIX	
Jozef Stefan Institute	Student	Course tools	Ad hoc	No	Survey/paper	
Humance AG	Student	Course tools	Ad hoc	No	Survey/paper	
Open University Nederland	Student	Course	Ad hoc	No	Survey/web tool	
Tallin University	Student	Course instructors	Ad hoc	No	Survey/paper and information system	Anonymous
University Leicester	Student	Course	Ad hoc	No	Survey/paper	
Umea University	Student	Course	Ad hoc	No	Survey/phpESP, VTSurvey, LimeSurvey	
Vienna University Economics and Business	Student	Course	Ad hoc	No	Survey/Paper and learn@wu	Survey templates
AGH University	Student	Course	Ad hoc	No	Survey/Moodle	
University of Vienna	Student	Course instructors	Ad hoc	Yes	Survey/Paper & EvaSyS, GmbH	Anonymous

3.2 Shared-teaching course evaluation

While the previous section analyses the current state of course evaluation practices in Europe, in this section a detailed study is presented focusing on a concrete scenario: shared-teaching. The shared-teaching scenario discussed covers a frequent setting in higher education, where several instructors collaborate in the teaching of the same course.

In order to capture the current state of shared-teaching evaluation in Europe, an evaluation pilot experience was performed with a group of ICOPER partners. This pilot experience was defined for the analysis and comparison of shared-teaching evaluation processes.

The pilot procedure consisted of participants responding to a survey, whose topics included the evaluation of the shared-teaching scenario (evaluators, *evaluees* and reviewers of the evaluation results), the use of standards and the evaluation process as a whole.

In the context of evaluation scenarios, the Tables 5 shows the answers received for the evaluation actors. Where X denotes most of the cases and * implies that only some cases present such behaviour.

Table 5 Evaluation scenarios: evaluators

Evaluee\evaluator	*Learners*	*Instructors*	*Administrative staff*
Instructors as a group	X		
Instructors individually	X		
Course	X		
Learning process			
Teaching materials	*		
Learners		X	

Continuing with the evaluation scenario analysis, the following Table 6 presents the stakeholders involved in the access to the evaluation results:

Table 6 Evaluation scenarios: reviewers

Evaluee\reviewer	*Learners*	*Instructors*	*Administrative staff*
Instructors as a group		X	*
Instructors individually	*	X	*
Course		*	X
Learning process			
Teaching materials		*	*
Learners	X	X	*

The survey responses showed the lack of use of standards for quality assurance and the use of customised quality assurance procedures to evaluate shared-teaching courses.

Among the common practices mentioned by the pilot participants it could be found that the data collection is often computer based, usually through a web application. The answers provided by the evaluators are usually anonymous and the learner comments are provided to the instructors as feedback.

4 Course evaluation support in learning management systems

In this section, an analysis of two open-source and well-known LMS, Moodle and .LRN, support for course evaluation is conducted. Besides, a study has been developed about how European institutions support e-learning material production and evaluation using e-learning tools (LMS).

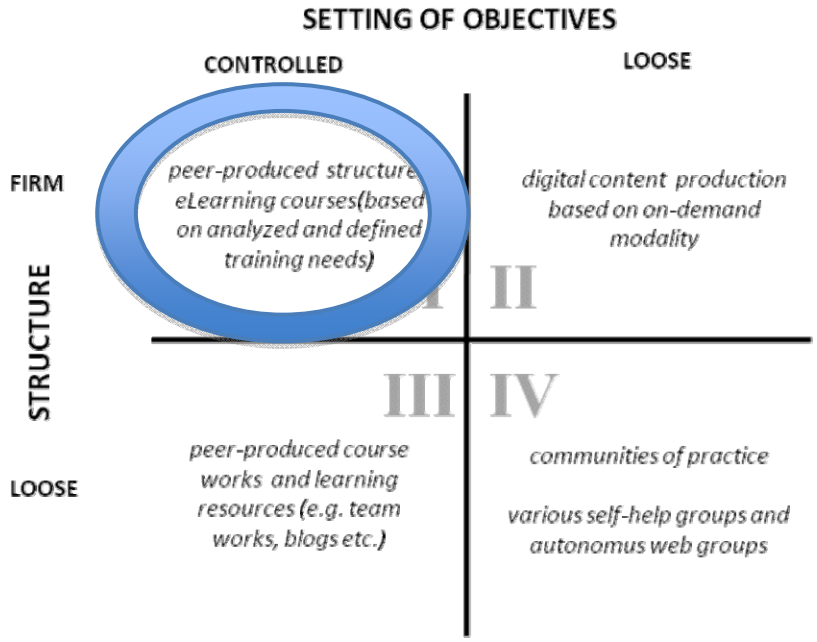
In EFQUEL (2009), some recommendations are made about quality management of peer production of e-learning content. These recommendations are valid for several scenarios as shown in Figure 2, which cover LMS capabilities and looser approaches (such as blogs, wikis, etc.). In this document the emphasis is put on the firm and controlled scenario of LMSs. Some of these recommendations are that quality assurance should change from product orientation to performance and competence orientation, and from the 'learning island' LMS to the internet as a learning environment.

Authors in EFQUEL (2009) also propose a series of aspects related to quality of tools used in the production flow:

- Access to the tools used: do all potential users have an easy access?
- Technical features of the tools: are the tools easy-to-use?
- Financial impact of the tools: are the tools provided free-of-charge or are there economical limitations for use?
- Data security and Intellectual Property Rights: are the tools provided ensuring data security and are their IPR policies clear and acceptable?
- Required user support: is user support required and how is it organised?
- Longevity of the tools: do we expect that the tools are available in the foreseeable future?

All these features will be analysed in the studied LMS platforms.

Figure 2 Context of peer production from (EFQUEL, 2009) (see online version for colours)



4.1 Moodle: course evaluation support

According to production flow quality assurance, Moodle fulfils:

- access to the tools used: good accessibility by all potential users because it is web-based
- technical features of the tools: it is quite easy-to-use
- financial impact of the tools: no cost because it is open source and free
- required user support: there are large sets of tutorials in Moodle website to support users and contextual help embedded in the platform

- data security and intellectual property rights: it does not provide mechanisms for data security and intellectual property rights.

Regarding course evaluation, teachers can create a Moodle quiz for the end of the course. But a better solution is the use of a third party module (evaluation/polling) that will be included as standard in Moodle 2.0.

4.2 LRN: course evaluation support

According to production flow quality assurance, .LRN fulfils:

- access to the tools used: good accessibility by all potential users because it is web-based
- technical features of the tools: it is quite easy-to-use
- financial impact of the tools: no cost because it is open source and free
- required user support: there are some unofficial tutorials but not for all features
- data security and intellectual property rights: it does not provide mechanisms for data security and intellectual property rights.

Regarding to course evaluation, it is not embedded in the courses, but the assessment and survey modules can support this task.

4.3 Study of production flow and course evaluation in European institutions

An in-depth analysis of a representative sample of ICOPER institutions has been done in order to determine the current practices regarding production flow and course evaluation. Both quantitative and qualitative studies have been performed, taking advantage of the possibility of analysing in depth the institutions inside ICOPER consortium.

The data presented is from five institutions all around Europe: Tallinn University, Télécom and Management SudParis, University of Jyväskylä, Oslo University College, Umea University and Carlos III University of Madrid. The methodology used was a survey about production flow and evaluation practices.

The first part of the survey is about e-learning material production flow and evaluation, and the conclusions are:

- there is not a general and global production flow. Each professor is responsible of the learning materials for his/her course, and has complete freedom for producing them
- learning materials, activities and assessment resources are created and supervised by the same person (or group of persons)
- evaluation is mandatory at the end of courses. Students rate course and teachers. Teachers have access to their ratings and comments

The second part about tools and support in evaluation and production flow:

- several tools are used: LMS (Moodle, .LRN, Fronter, IVA) and authoring tools (TATS, ADA)

- none of the tools provide specific support for integrating the evaluation in the production flow. The reviewer role is not provided by platforms, as would be desirable for quality control because revision is a habitual mechanism in quality assurance
- although tools support the possibility of defining surveys or questionnaires that could be used for course evaluation, it is not a functionality automatically integrated in the courses
- evaluation results are stored in institutions databases.

5 Conclusions

The study detailed in this article, concretely the interviews performed to the ICOPER partners, has shown that currently there is not such thing as a course evaluation standard, since each institution manages and assures the quality of its TEL approaches using ad hoc procedures that are customised to their needs. The shared-teaching evaluation pilot experience was intended to analyse the different approaches taken to assure quality, focusing in a specific scenario. Finally, the study and summary of Parts 1 and 3 of the standard ISO/IEC 19796 are intended to serve as a guide for future competence-driven quality assurance reference models.

In the course evaluation domain, a trend has been identified: none of the analysed institutions is using any standards or specifications. As explained in Pawlowski (2007), ISO/IEC 19796 can be useful for educational organisations but it is necessary to define procedures to adapt it in an organisation and to adopt it on a broad base. There appear to be some sets of guidelines used within individual institutions that are followed without any direct relation to evaluation standards. In this way, explicit quality assurance is not performed. These guidelines do not follow a common pattern easily identified, constituting a very heterogeneous set. It is fair to say that, in order to motivate organisations to go through this quality processes, references to external standards need to be emphasised, possibly by professional accrediting bodies.

Regarding course evaluation support in European institutions LMS, the platforms under study (Moodle and .LRN) do not provide support for it. Mechanisms for course evaluation and review are not supported by the platforms, because they tend to implement a more agile content production flow (e.g. the instructors themselves can edit the content in the final production system directly).

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Notes

1 As explained in following sections, the only learning quality standard (ISO/IEC 19796) is not complete yet.